We claim:

1. A catadioptric projection objective for microlithography comprising:

   at least one curved mirror having an optical axis that is deformable, and

   adjusting elements that deform said curved mirror, in which said adjusting elements comprise at least one actuator, acting collectively upon at least two discrete contact places on said curved mirror that are arranged symmetrically to the optical axis of said curved mirror and with which astigmatism is corrected.

2. The catadioptric projection objective according to claim 1, comprising exactly one curved mirror.

3. The catadioptric projection objective according to claim 1, further comprising an additional adjusting element with an actuator with a bridging part with four contact places on said curved mirror that are arranged in fourfold symmetry to the optical axis of said curved mirror, thus being adapted to the correction of imaging errors of four fold symmetry.

4. The catadioptric projection objective according to claim 1, further comprising:

   at least one sensor sensing a parameter of a projected image, and

   a control system that joins together said at least one sensor and said adjusting elements into a control circuit in which image errors are minimized.

5. The catadioptric projection objective according to claim 4, further comprising:

   at least one second sensor, and

   a control system that joins together said at least one second sensor and said adjusting elements into a control circuit in which image errors are minimized.

6. The catadioptric projection objective according to claim 4, in which said at least one sensor comprises a wavefront sensor.

7. The catadioptric projection objective according to claim 4, in which said at least one sensor comprises at least one of a camera and a CCD camera.

8. The catadioptric projection objective according to claim 1, further comprising a sensor that senses at least one of time, temperature, pressure, an irradiation quantity, a number of light pulses and a number of exposures.

9. The catadioptric projection objective according to claim 1, further comprising at least one optical element that is variable in position.

10. The catadioptric projection objective according to claim 9, in which said position of said at least one optical element is variable axially in the direction of the optical axis of said projection objective.

11. The catadioptric projection objective according to claim 9, in which an optical path through said projection objective is variable.

12. The catadioptric projection objective according to claim 9, in which said position of said at least one optical element is variable transversely of the optical axis of said projection objective.

13. The catadioptric projection objective according to claim 9, in which said position of said at least one optical element is variable rotationally around the optical axis of said projection objective.

14. The catadioptric projection objective according to claim 1, in which said adjusting elements have at least one actuator having a form and arrangement that is matched to a form of deformation of said at least one curved mirror.

15. A catadioptric projection objective for microlithography, comprising:

at least one curved mirror that is deformable, which deformability of said curved mirror includes shapes of said curved mirror with at least one of twofold rotational symmetry, fourfold rotational symmetry, and superpositioning of shapes with said symmetries, and

at least one of actuators and of adjusting elements actuated by actuators for deformation of said curved mirror, the number, shape and position of said actuators or adjusting elements being matched to the shape and symmetry of specific deformations of said curved mirror.

16. The catadioptric projection objective according to claim 15, in which said curved mirror is rotationally symmetrical in its basic shape and has a gradient in a radial direction that increases monotonically with radius.

17. The catadioptric projection objective according to claim 16, in which said adjusting elements comprise four actuators or action places that superpose on said basic shape a deformation with fourfold rotational symmetry to the optical axis of said projection objective, compensating for a wave front deformation of fourfold rotational symmetry.

18. The catadioptric projection objective for microlithography comprising: at least one curved mirror that is deformable, and adjusting elements that deform said curved mirror, in which said adjusting elements are matched to given image errors and their correction, further comprising six places at which an actuator or adjusting element acts on said curved mirror, four of said places being arranged in fourfold symmetry, actuation of which is synchronized pairwise and a remaining

two of said places being arranged in twofold symmetry on an angle bisector between said four of said places.

19. The catadioptric projection objective according to claim 1, in which actuators or adjusting elements actuated by actuators act in at least one of the direction of the optical axis of said projection objective or perpendicularly thereto.

20. An operating process that increases imaging quality of a microlithographic projection exposure device with a catadioptric objective with at least one curved mirror, comprising the step of deforming said curved mirror by actuators or adjusting elements at only two to four pairs of action places with no more than one adjusting element per pair of action places.

21. The operating process according to claim 20, comprising deforming said curved mirror at three pairs of action places.

22. The process according to claim 20, further comprising the steps of, during exposure or during a change of wafer or reticle in a lithography apparatus, sensing at least one of image field displacement, scale, focus position, astigmatism and image shell in the region of an image plane, and driving said actuators or adjusting elements in dependence on sensed information.

23. The process according to claim 20, comprising sensing operating parameters of a projection exposure device and driving said actuators or adjusting elements in dependence on said operating parameters.

24. The process according to claim 23, in which said step of sensing operating parameters comprises sensing at least one of the numerical aperture of said catadioptric objective, type and degree of coherence of an illuminating device,

and properties of a mask.

25. The process according to claim 24, in which said step of sensing operating parameters comprises sensing the average transmission of said mask.

26. The process according to claim 20, further comprising moving at least one lens of said catadioptric objective.

27. The process according to claim 26, in which said step of moving said at least one lens comprises movement selected from displacing said at least one lens along said optical axis of said projection objective, rotating said at least one lens around said optical axis and displacing said at least one lens perpendicular to said optical axis.

28. The process according to claim 20, further comprising varying the position of at least one of a mask or a wafer.

29. The process according to claim 20, further comprising deforming said curved mirror to compensate for at least one of lens heating and compaction.

30. The process according to claim 20, further comprising matching given image errors, in which said adjusting elements are matched at least to one given image error and said given image errors are corrected.

31. A catadioptric projection objective for microlithography comprising:

at least one curved mirror that is deformable,

adjusting elements that deform said curved mirror, and

an additional adjusting element with an actuator with a bridging part with four discrete contact places on said curved mirror that are arranged in fourfold

symmetry to the optical axis of said curved mirror, thus being adapted to correct an imaging error of four fold symmetry.

32. The catadioptric projection objective according to claim 15, in which actuators or adjusting elements actuated by actuators act in at least one of the direction of the optical axis of said projection objective or perpendicularly thereto.

33. The catadioptric projection objective according to claim 18, in which actuators or adjusting elements actuated by actuators act in at least one of the direction of the optical axis of said projection objective or perpendicularly thereto.

34. A catadioptric projection objective for microlithography comprising:

at least one curved mirror that is deformable and comprises an optical axis, and adjusting elements that deform said curved mirror, in which said adjusting elements comprise at least one actuator with a bridging part with four contact places on said curved mirror, thus being adapted to a correction of imaging errors of four fold symmetry.

35. A catadioptric projection objective for microlithography comprising:

at least one curved mirror that is deformable having an optical axis, and

adjusting elements that deform said curved mirror, in which said adjusting elements comprise at least one actuator, acting collectively upon at least two discrete contact places on said curved mirror that are arranged symmetrically to the optical axis of said curved mirror matching symmetry of an astigmatism and with which said astigmatism is corrected.